



Transportation Synthesis Report

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Truncated Warning Domes

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**Bureau of Highway Development
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Transportation Synthesis Reports (TSRs) are brief summaries of currently available information on topics of interest to WisDOT technical staff in highway development, construction and operations. Online and print sources include NCHRP and other TRB programs, AASHTO, the research and practices of other state DOTs, and related academic and industry research.

REQUEST FOR REPORT

WisDOT, like its peers in other states, seeks information on the most durable and easy-to-install options for truncated warning domes, a process hastened by FHWA announcements last May that the detectable warnings are again required by the Americans with Disabilities Act after a decade-long suspension of the requirement. The RD&T Program was asked to report on the best practices of other states.

SUMMARY

The recent ADA Accessible Guideline (ADAAG) standards designate truncated domes as the only approved detectable warnings curb design for the visually impaired. A search of transportation Web sites, searchable databases, academic research sites, and newspaper databases shows that many states are uncertain about best practices. The FHWA and state DOTs refer for data on dome designs to a survey commissioned by the Access Board on international practices and published in 2000. In climates as harsh as the upper Midwest, states that have settled on a practice appear to prefer brick or concrete truncated-dome pavers. Another possibility is a relatively new process mentioned in the Access Board report by which crews attach resin-compound domes directly onto finished concrete. Approaches taken by Ohio, Washington and Oregon are described below.

WisDOT has constructed and is currently evaluating several truncated warning dome systems as part of a Federal Experimental Project. Under the leadership of the Bureau of Highway Construction's Technology Advancement Unit (TAU), and with financial support from the FHWA Wisconsin Division, installations were completed in the city of Madison in August and September 2002. A PowerPoint presentation showing the work is available on the WisDOT Research and Library Web pages at <http://www.dot.wisconsin.gov/library/research/docs/finalreports/tau-finalreports/domes.pdf>. For more information, contact Peter Kemp, new products/new methods engineer (peter.kemp@dot.state.wi.us, 608-246-7953).

ACCESS BOARD REPORT

Detectable Warnings: Synthesis of U.S. and International Practice, Billie Louise Bentzen, et al, May, 2000. Contracted by the U.S. Access Board, this thorough report on truncated domes around the globe addresses various designs, experiences with installation, maintenance, snow clearing, and more. The report considers work in Japan, England, Australia, France, Italy, and so on, as well as in the U.S., weighing the legal, technical, and empirical vectors upon truncated dome specifications. Furthermore, it includes photographs and graphs, extensive lists of suppliers and products, and contacts at countries and cities and counties sited.

<http://www.access-board.gov/publications/DW%20Synthesis/report.htm>. The two most common choices for installations are tiles and pavers.

Tiles. Concrete and ceramic overlays, or tiles, report easy installation and maintenance in non-inclement climates like Georgia and California, less success in snowy climates like New York City. Outside installation proved difficult in NYC, and durability poor. Formed and pre-cast tiles set in concrete in Harrisburg, Penn. proved difficult to install and handled wear poorly. Ceramic tiles also have been used, but this study offered little data on their use.

Pavers. Brick and concrete pavers work well in wintry climates. Transportation engineers say installation proves no different than with any other paver. Cleveland, Ohio and Baltimore County, Maryland reported few problems with maintenance, including snow-plowing. Generally, this study notes that snowplows sometimes sheer off domes, but this is more typical of concrete domes formed on site than of pavers. Erosion of domes by street salts have been reported, though less commonly of pavers than on-site forms.

SPECIFIC STATES

Ohio has chosen brick and concrete pavers as its detectable warnings format of choice. The Ohio DOT considers these the most durable for its climate. An internal memo and information on installation and on retro-fitting curbs can be found on the ODOT web site. Go to <http://www.dot.state.oh.us/roadwayengineering/>. Under 6/7/02, links to the memo, and to specs and information finalized in July, are all listed.

Washington State chooses familiar forms of truncated domes, from pavers to individually applied domes. A list of manufacturers of dome products includes Vanguard ADA, suggesting acceptance of the technology for state practice. See <http://www.wsdot.wa.gov/TA/Operations/LAG/Detectable8-2002.doc> for the list of 16 suppliers.

Oregon keeps a short list of truncated dome manufacturers that it approves for detectable warning installations, including Vanguard ADA. State policy and a list of approved suppliers can be seen in amendments to the Oregon Code at <http://www.odot.state.or.us/techserv/roadway/specs/specials/updates/9-26-02/sp759.pdf>.

PAVER ALTERNATIVE: RESIN-COMPOUND DOMES

A Snohomish, Washington company called TILCO Vanguard ADA has developed a resin-compound truncated dome that can be applied to the surface of existing sidewalk curbs and ramps. See the company web site, <http://www.tilco-inc.com/>. Or look at an on-line press kit, <http://www64.pair.com/tilco/press.html>. For a brief description of the installation process, see <http://www.asphalt.com/trends/detect.html>. See also *Seattle Times* 09.25.02; *Puget Sound Business Journal* 03.24.00, <http://seattle.bizjournals.com/seattle/stories/2000/03/27/focus6.html>.

Installation. Installers lay a flexible rubber mat over the cured concrete area to be fitted, then inject into apertures the resin compound. Domes set within four hours. Vanguard claims the technology can be used in Wisconsin.

Maintenance. Unknown. It will be worth noting through this winter the experience of DOT regions on the east side of the Cascade Mountains in Oregon and Washington. The mountains and plains experience heavy snowfall and cold temperatures like the Plains states.

FEDERAL LINKS

The Access Board offers links to a variety of studies on its Web site. See <http://www.access-board.gov>. Design specifications can be seen by clicking on Publications, going to Public Rights-of-Way, and then clicking on Building a True Community: Accessible Public Rights-of-Way. Click on Part III, then on X02.5 Pedestrian Street Crossings. See section X02.5.6.2 following.

The FHWA memo to state DOTs regarding the truncated dome requirement as affirmed in 2002 can be read at <http://www.fhwa.dot.gov/environment/bikeped/dwm.htm>.

For the Department of Justice statement of the requirement, per its duties in enforcing the American with Disabilities Act, see www.usdoj.gov/crt/ada/detwarn.htm.

In progress, the *Gloucester Intelligent Transportation Systems Network* (TRB Accession No. 816700, commissioned by the Federal Transit Administration) project looks at a variety of ADA compatibility facets of a rail station construction. One such facet includes ADA pedestrian access compliance from a new parking lot. See summary, <http://rip.trb.org/browse/dproject.asp?n=6011>.